

Appln. No. 10/790,959
Response to Office Action mailed January 4, 2006

R E M A R K S

Editorial revisions were made to the claims.

The following features from page 40, lines 21 to 24 in the specification were added to claims 9 and 22: "preheating the steel at a room temperature or at a temperature equal to or lower than the A1 temperature."

The feature of a gear, which was added to claims 10 and 23, is supported in the first full paragraph on page 11 of the specification.

The term "slipping condition" recited in claims 10 and 23 is supported by original claim 11.

A divisional application (Serial No. 11/235,425) of this application has been filed.

Claims 1 to 12, 20 to 23 and 25 to 27 were rejected under 35 USC 112, second paragraph, for the reasons set forth in item nos. 3 to 20 on pages 2 to 4 of the Office Action.

Regarding item no. 4 at the middle of page 2 of the Office Action, "0.2 to 2 wt% of one or more alloy elements" in claim 1 is intended to be the total sum of the elements.

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Concerning item no. 5 at the middle of page 2 of the Office Action, the first recitation of "0.4 to 4.0% by volume of one or more compounds" in claim 1 is contained in a composition of a steel. The second recitation of "0.4 to 4.0% by volume of one or more compounds" in claim 1 is contained in a rolling contact surface structure which has been subjected to case-hardening by induction hardening. Since the terminology "0.4 to 4.0% by volume" is recited as a volume percentage, it is not a term representing a chemical composition, but rather an ingredient amount of the structure of carbides, nitrides or carbonitrides such as TiC, V₄C₃, TiN and TiCN.

Claim 1 was amended to reply to item no. 6 at the bottom of page 2 of the Office Action.

With respect of item no. 7 at the bottom of page 2 of the Office Action and item no. 16 at the top of page 4 of the Office Action, the position was taken that "2 to 15% volume of cementite particles containing 2.5 to 10wt% Cr" in claim 2 is indefinite, since cementite is a carbide (Fe₃C) and cannot contain Cr.

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Applicants respectfully disagree with the above position for the following reasons. It is well-known that various alloy elements are solids dissolved in large amounts in cementite contained in a steel having alloy elements. Further, it is known that when a heat treatment in a two phase (ferrite + cementite) region is carried out, alloy elements are distributed in a specific concentration ratio as described in the present specification, and Cr is highly concentrated in the cementite.

Facts relevant to the above-described matter are described in the enclosed copy and English-language translation of the "IRON AND STEEL HANDBOOK", Third Edition, Maruzen Co., Ltd., (1981) (p142), wherein cementite is described as $(Fe,M)_3C$ therein (note that "M" is an alloy element).

Moreover, the position was taken in the Office Action that it is uncertain whether 2.5 to 10 wt% Cr is based on the total Cr content of the alloy or based on the total Cr content in the surface hardened area. It is respectfully submitted that the above claim amendments clarify this matter.

Regarding item no. 8 at the top of page 3 of the Office Action, claim 3 was amended to replace "fine" with --refined--.

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Concerning item no. 9 at the top of page 3 of the Office Action, claim 4 was amended to avoid this ground of rejection.

Claim 5 was amended to reply to item no. 10 on page 3 of the Office Action.

To reply to item no. 11 on page 3 of the Office Action, claim 1 was amended to include the following: "the rolling contact surface layer has a quench hardened layer which has been subjected to induction hardening."

Claim 9 was amended to respond to item no. 12 on page 3 of the Office Action.

Claim 10 was amended to reply to item no. 13 at the middle of page 3 of the Office Action.

Claim 20 was amended to respond to item nos. 14 and 15 on page 3 of the Office Action by following the Examiner's suggestions to add method steps.

Regarding item no. 17 at the top of page 4 of the Office Action, claim 22 was amended to replace "invention" with --steel--.

Claim 22 was amended to reply to item no. 18 on page 4 of the Office Action.

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Claim 23 was amended to reply to item no. 19 on page 4 of the Office Action.

Regarding item no. 20 at the middle of page 4 of the Office Action, claim 27 was amended by following the Examiner's suggestion.

In view of the above, withdrawal of the 35 USC 112, second paragraph rejection is respectfully requested.

Claims 1 to 12, 20 to 23 and 25 to 27 were provisionally rejected on the grounds of non-statutory obviousness-type double patenting as being unpatentable over claims 1 to 15, 17 to 20 and 22 of copending application Serial No. 10/790,931 for the reasons set forth on pages 4 and 5 of the Office Action.

A TERMINAL DISCLAIMER is being filed concomitantly herewith to avoid the double patenting rejection. Also enclosed is a Form PTO-2038 in the amount of \$130 in payment of the required fee for submission of a TERMINAL DISCLAIMER.

The Office Action enclosed copies of the INFORMATION DISCLOSURE STATEMENTS BY APPLICANT Forms PTO/SB/08A and PTO/SB/08B dated September 23, 2005; Forms PTO/SB/08A and PTO/SB/08B dated October 29, 2004; and Forms PTO/SB/08A and

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PTO/SB/08B dated March 1, 2004, with the Examiner's initials in the left column next to most of the cited publications, indicating that each of the initialed cited publications was considered and made of record. The Examiner, however, drew a line through each of (i) JP 2003-328078; (ii) HEAT TREATMENT OF STEEL (5th Edition), edited by the Iron and Steel Institute of Japan, March 15, 1985, pp. 44-46 and 110; and (iii) K. KOMINE et al., ON RELATIONSHIP BETWEEN HALF VALUE BREADTH AND HARDNESS OF QUENCHED-TEMPERED STEELS; Materials, Vol. 26, No. 280, P26, issued by the Society of Materials, Japan, pp. 24-30. The Examiner's reasons for not considering these publications were that English-language translations were not provided for these publications and a publication date was not set forth for the K. KOMINE et al. publication (see item no. 25 on page 6 of the Office Action).

Enclosed is a copy of the first page of the Komine et al. publication, which indicates that the publication date is January 15, 1977.

U.S. Patent application Serial No. 10/391,732
(US2004/0047757) corresponds to JP 2003-328078.

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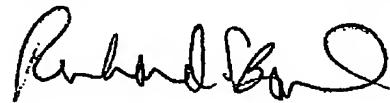
An INFORMATION DISCLOSURE STATEMENT is being filed concurrently herewith. Such INFORMATION DISCLOSURE STATEMENT includes a Form PTO/SB/08A which identifies the aforesaid US 2004/0047757.

Reconsideration is requested. Allowance is solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

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Respectfully submitted,



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Encs.: (1) PETITION FOR EXTENSION OF TIME
(2) copy of English-language translation of the "IRON AND STEEL HANDBOOK,"
Third Edition, Maruzen Co., Ltd., (1981) (p142)
(3) TERMINAL DISCLAIMER, including Form PTO-2038 in the amount of \$130
(4) copy of the first page of the KOMINE et al. publication
(5) INFORMATION DISCLOSURE STATEMENT, including
Form PTO-2038 in the amount of \$180